Chapter 1 Outline

Anatomy

Study of body structure

Physiology

Study of how the body functions

Body organized from simple to complex (Fig. 1-1)

Chemicals

Cells

Tissues

Organs

Body systems

Whole organism

Body systems can be grouped according to general functions

Protection, support, and movement

Integumentary system

Skeletal system

Muscular system

Nervous system

Endocrine system

Circulation

Cardiovascular system

Lymphatic system

Nutrition and fluid balance

Respiratory system

Digestive system

Urinary system

Production of offspring

Reproductive system

All life-sustaining reactions together = metabolism. Two phases (Fig. 1-2)

Catabolism: complex to simple

Breakdown of nutrients yields simple chemical building blocks and energy

Anabolism: simple to complex

Simple compounds used to manufacture materials needed for

* + - * Growth
      * Function
      * Repair of tissues

Adenosine triphosphate (ATP)

* Energy from breakdown of nutrients — the “energy currency”

Extracellular fluids

* All body fluids outside cells (e.g., blood, lymph):
* Bathes the cells
* Carries nutrient substances to cells
* Transports waste products from cells
* Transports nutrients into and out of cells
* Intracellular fluid
* Contained within cells
* Extracellular and intracellular fluids combined equal 60% of adult’s weight.

Definition of homeostasis: steady state within an organism, internal balance

* Examples of homeostasis: maintenance within set limits of body temperature, heart rate, blood pressure

Negative feedback (Figs. 1-3, 1-4, 1-5)

* Reverse any upward or downward shift in body conditions to return to normal range
* Example: glucose / pancreas / insulin production

Positive feedback

* Given action promotes more of the same until:
* Stimulus removed
* Outside force stops cycle
* Example: childbirth uterine contractions / pituitary gland / oxytocin release / further contractions

Superior — above, in a higher position

Inferior — lower, below

Ventral, anterior — located toward the belly surface

Dorsal, posterior — located toward the back surface

Cranial — nearer to the head

Caudal — nearer to the sacral region of the spinal column

Medial — nearer an imaginary plan through vertical midline of body

Lateral — toward a side, away from midline

Proximal — nearer the origin of a structure

Distal — farther from origin of a structure

Planes of division (body) (Fig. 1-8)

Frontal (or coronal) plane — in line with ears and down middle sideways, creates front and back sections

Sagittal plane — creates right and left sides

Transverse (or horizontal) plane — crosses other two planes (many such planes exist — create upper and lower sections)

Tissue Sections (Fig. 1-9)

Cross section

Longitudinal section

Oblique section

Two main cavities of body are the dorsal cavity and ventral cavity; the ventral cavity is the larger of the two (Fig. 1-11)

Dorsal cavity — has two subdivisions

Cranial cavity

Spinal cavity

Ventral cavity — two subdivisions separated by diaphragm

Thoracic cavity: above diaphragm

* + - * Pericardial cavity holds heart
      * Pleural cavity holds lungs

Abdominopelvic cavity: below diaphragm, has two regions

* + - * Abdominal cavity
      * Pelvic cavity

Nine regions of the abdomen (Fig. 1-13)

Three central regions:

Epigastric

Umbilical

Hypogastric

Three regions on right and left each, total of six

Hypochondriac

Lumbar

Inguinal

Division into four quadrants sometimes used (Fig. 1-14)

Simpler but less precise

Metric system

Used for all scientific measurements

Based on units of 10

Units of length (Fig. 1-15)

Meter (m) is the basic unit

1 meter = 3.3 feet

Also, kilometer (km), centimeter (cm), millimeter (mm)

Units of weight

Gram (g) is the basic unit

30 grams = about 1 oz

Also, kilogram (kg), milligram (mg)

Units of volume

Liter (L) is the basic unit

1 liter = 1.06 quarts

Also, milliliter (mL)

kilo- = 1,000

centi- = 1/100

milli- = 1/1000

micro- = 1/1,000,000

Studies of the human body: *anatomy, dissection, physiology*

-*tomy* (cutting, incision of)

-*dis* (apart, away from)

*physi/o* (nature/physical)

Body Processes: *catabolism, anabolism, homeostasis*

*cata-* (down)

*ana-* (upward, again, back)

*home/o-* (same)

*stat* (stand, stoppage, constancy)